Petr Stepanov

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> Ph.D. graduate in physics with expertise in materials science, gamma spectroscopy, defect studies, and nuclear physics. Over 7 years of experience in data analysis, particle simulations and scientific software development.

Summary of Qualifications

- More than 7 years of experience in GUI desktop software development for data analysis and statistics (C++, ROOT, Qt, Python, Wolfram Mathematica).
- Solid background in Monte-Carlo particle simulations (Geant4) in high-energy physics (HEP) and photonics research.
- BASH scripting on High-Performance Computing (HPC) Linux environment.
- Hands-on experience with data acquisition setups and fast electronics (Hamamatsu, ORTEC, Canberra, Tektronix).
- Strong materials science skills. Application of the positron spectroscopy (PAS) and SEM techniques for defect characterization and porosity studies in materials.

Work Experience

Full-Stack Developer

Sticker Store LLC, Portland, OR.   *Feb 2023 - Current*

- Designed and programmed online e-commerce store (Figma, HTML, CSS, Bootstrap, SASS, Express.JS, EJS, Node.js).
- Improved the Google PageSpeed Insights metrics (CLS, LCP) up to 97%.
- Set up low frequency keyword campaign on Google Analytics.
- Exported local product database to Google Merchant.

Research Collaborator (On-Site)

Thomas Jefferson National Laboratory (JLab), Newport News, VA.   *Jul 2020 - Jan 2023*

- Coded a Geant4-based simulation for studying the optimal light guide length (range 0-10 cm) for the EM calorimeter used in the Electron-Ion-Collider (EIC) project. Link to GitHub.
- Used Machine Learning (ML) techniques to perform binary classification of thousands of signals from a data acquisition (DAQ) setup. Link to GitHub.
- Applied CERN ROOT framework (C++) to perform statistical analysis of a significant amount (over 100 GB) of the raw experimental data of the Kaon LT experiment at JLab. Link to GitHub.
- Utilized SLURM functionality on the High-Performance Computing (HPC) environment to execute a series of simulations in parallel. This reduced the wall time by more than 10 times.
- Set up data acquisition system that performs triggered waveform acquisition involving 3 devices - Tektronix oscilloscope, Network Attached Storage, and RedHat computer (SAMBA, Python, National Instruments NI-VISA library).
- Contributed 100+ shifts at Hall C at the Thomas Jefferson Particle Accelerator facility for the Pion LT project.

Postdoctoral Researcher (Remote)

Catholic University of America (CUA), Washington, DC.   *Jul 2020 - Jan 2023*

- Programmed a Geant-4 computer simulation (C++, CMake, Eclipse IDE, gdb) to study the performance of a novel scintillation material for EIC, Brookhaven National Lab. Link to GitHub.
- Visualized energy deposition profiles and calculated energy resolutions for a variety of detector assemblies.
- Teaching experience. Mentoring students within a 3-month Research Experiences for Undergraduates (REU) program at the Physics Department at CUA.
- Enhanced debugging of the CERN library source code led to the publishing of more than 10 bug reports on the ROOT (C++) forum.

Research Assistant

Bowling Green State University (BGSU), Bowling Green, OH.   *Aug 2014 - May 2020*

- Assembled positron lifetime and Doppler spectrometers from ORTEC and Canberra (Mirion) fast electronic units. Utilized High-Purity Germanium Detectors (HPGe) and scintillation-based detector systems for single-photon counting.

- Defined and resolved novel kinetic equations of behavior of e+ and Ps atoms in solids, liquids, and nano-powders (Wolfram Mathematica).
- Developed three open-source programs (C++, CERN ROOT) for fitting and interpretation of the experimental spectra for above data acquisition systems (DAQ).
- Combination of the hardware and software skills allowed for:
  - Estimation of defect concentrations and grain sizes in solids.
  - Classification of defect types (vacancies, dislocations).
  - Characterization of the chemical decoration of defects.
- Developed website (Express.js, Gulp, Bootstrap) and visual identity for the SelimLab research group.

Education

Bowling Green State University (BGSU) • OH, United States   *Aug 2014 - May 2020*
Ph.D. in Photochemical Sciences • GPA 3.423. Dissertation: Novel developments in positron spectroscopy (PAS).

Ohio Supercomputer Workshop • OH, USA   *Jan 2017 - Feb 2017*
Hands-on sessions in High-Performance Computing Infrastructure (HPC, SSH, BASH, SLURM).

National Research Nuclear University (MEPhI) • Moscow, Russia   *Sep 2004 - Feb 2011*
B.S. and M.S. in Solid State Physics. Thesis: application of PAS for defect concentration studies in bulk materials.

Professional Networks

- Find examples of my code on GitHub (50+ repositories).
- Discover my professional contacts on LinkedIn (200+ connections).
- Skim through the list of my publications on Google Scholar (24 articles, 300+ citations).

Relevant Interests

- Hosting an open-source project for keyboard remapping on Linux 300+ stars on GitHub.
- Developed a RAMDisk plugin for Linux that provides 50% increase in source code indexing time.
- Created two shared libraries for the ROOT data analysis framework [1, 2].